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Neck Injury Device Turning Heads

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CEDARVILLE, OHIO -- Emergency care can be difficult to manage. Consider a traumatic laceration to the neck from a bullet wound or car accident. Catastrophic blood loss could cause a fatality in minutes, so sufficient pressure must be applied to the injury. If the correct amount of pressure is not applied at the right location, the neck laceration may continue to bleed or the airway may be constricted, leading to brain damage, suffocation and possibly death.

These scenarios were the catalyst behind five Cedarville University seniors designing a product to address these concerns and save lives.

The students, Lauren Edmonson, allied health major from Ogden, Utah; Austin Ballentine, mechanical engineering major from New Philadelphia, Ohio; Devan Kienitz, mechanical engineering major from Green Bay, Wisconsin; Benito Stouffer, mechanical engineering major from Lee's Summit, Missouri; and Caleb Williams, mechanical engineering major from Lancaster, Pennsylvania, are working on this device as their senior capstone project.

Dr. Dennis Sullivan, professor of pharmacy practice is serving as the medical faculty adviser to the project.

Their primary focus is zone two of the neck, above the clavicle (collarbone) and below the mandible (jaw). In severe traumatic injuries, the common carotid artery and jugular veins bleed profusely. Left untreated, the lack of blood flow to the brain proves fatal.

"In my emergency medical technician (EMT) class, I learned about a man who was in a car accident and incurred a severe laceration on his neck," explained Edmonson. "Fortunately, an EMT was able to apply the right amount of pressure to his neck with his hand until the patient could receive further treatment. This saved the man's life. However, I was concerned that there was no product on the market to treat injuries like this, and if I were to incur such an injury, I would not want my life to literally be in someone else's hands to that extent."

The finished product will most likely resemble three quarters of a rubberized donut that will be placed over the laceration to stop the bleeding. Attached to this "donut" will be an inflatable bladder or mechanical device that can apply the correct amount of pressure to stop the bleed, while not cutting off air flow.

Col. Douglas Hodge, a retired Air Force physician assistant and the associate director at the Center for Medical Readiness at Wright State University, is collaborating on the project. His expertise in the field of

military emergency medicine is allowing the team to design a device that may one day be used in the military.

“What stands out about this project is the interdisciplinary element,” explained Dr. Tim Norman, distinguished professor of mechanical and biomedical engineering. “Departments that typically don’t work together can collaborate to make a big impact on the medical profession.”

“Cedarville is very unique in that students have the opportunity to propose a project to engineering faculty for the senior design course and departments can seamlessly collaborate and make the project happen.”

The proposal was finalized in September and the projected finish date is May 2019.

“For engineering students, this provides an opportunity to work on a lifesaving device in a way that we can show our creativity and our technical mastery of these subjects,” said Kienitz.

Norman explained that in the professional world, professionals from multiple fields must collaborate for breakthrough changes. “Although Lauren is an allied health major, she is an invaluable part of the group,” Norman said. “As engineers, we value what she brings to the table because her thoughts simulate what happens in the workplace. Cedarville can do this because of our size and our faculty’s commitment to equipping students for their professions.”

Located in southwest Ohio, Cedarville University is an accredited, Christ-centered, Baptist institution with an enrollment of 4,193 undergraduate, graduate, and online students in more than 150 areas of study. Founded in 1887, Cedarville is recognized nationally for its authentic Christian community, rigorous academic programs, strong graduation and retention rates, accredited professional and health science offerings, and leading student satisfaction ratings. For more information about the University, visit www.cedarville.edu.